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10/062,299	01/31/2002	Leroy E. Hood	P-IS 5150	2563

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EXAMINER

SMITH, CAROLYN L

ART UNIT	PAPER NUMBER
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1631

DATE MAILED: 09/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/062,299

Applicant(s)

HOOD ET AL.

Examiner

Carolyn L Smith

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-49 is/are pending in the application.
- 4a) Of the above claim(s) 1-21 and 36-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 22-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-49 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicants' remarks, filed 6/24/04, are acknowledged.

Applicants' arguments, filed 6/24/04, have been fully considered but they are not deemed to be persuasive. Rejections and/or objections not reiterated from the previous office actions are hereby withdrawn. The following rejections and/or objections are either reiterated or newly applied. They constitute the complete set presently being applied to the instant application.

The reasons for restriction are still deemed proper and it remains FINAL.

Applicants may petition the restriction requirement, if they so desire.

The two website documents, filed in the 12/26/02 information disclosure statement, have been looked at but not considered on the merits. If Applicants wish the two documents to be considered on the merits, the dates of publication must be set forth.

Claims 22-35 are herein under examination.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The rejection of claims 22-35 is maintained under 35 U.S.C. 101 because the claims are directed to non-statutory subject matter.

This rejection is maintained and reiterated for reasons of record.

As written, the claims encompass computer-related methods that appear to lack any physical result performed outside of a computer. For example, in claim 22, part (a), is directed to a reference biological system that is perturbed. This perturbation may be interpreted to be either in a computer simulation or as a perturbation only in a computer simulated biological system. As claim 22 can be interpreted to encompass a perturbation activity in said part (a) only within a computer without any physical transformation outside of a computer, this is considered non-statutory subject matter.

As stated in MPEP § 2106, (IV)(B)(2)(b), to be statutory, a claimed computer-related process must either: (A) result in a physical transformation outside the computer for which a practical application in the technological arts is either disclosed in the specification or would have been known to a skilled artisan (discussed in MPEP § 2106 (IV)(B)(2)(b)(i)), or (B) be limited to a practical application within the technological arts (discussed in MPEP § 2106 (IV)(B)(2)(b)(ii)).

As stated in MPEP § 2106 (IV)(B)(2)(b)(i), the independent physical acts may be post- or pre-computer processing activity as described below:

A process is statutory if it requires physical acts to be performed outside the computer independent of and following the steps to be performed by a programmed computer, where those acts involve the manipulation of tangible physical objects and result in the object having a different physical attribute or structure. *Diamond v. Diehr*, 450 U.S. at 187, 209 USPQ at 8. Thus, if a process claim includes one or more post-computer process steps that result in a physical transformation outside the computer (beyond merely conveying the direct result of the computer operation), the claim is clearly statutory.

Another statutory process is one that requires the measurements of physical objects or activities to be transformed outside of the computer into computer data (In re Gelnovatch, 595 F.2d 32, 41 n.7, 201 USPQ 136, 145 n.7 (CCPA 1979) (data-gathering step did not measure physical phenomenon); *Arrhythmia*, 958 F.2d at 1056, 22 USPQ2d at 1036), where the data comprises signals

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corresponding to physical objects or activities external to the computer system, and where the process causes a physical transformation of the signals which are intangible representations of the physical objects or activities. Schrader, 22 F.3d at 294, 30 USPQ2d at 1459 citing with approval Arrhythmia, 958 F.2d at 1058-59, 22 USPQ2d at 1037-38; Abele, 684 F.2d at 909, 214 USPQ at 688; In re Taner, 681 F.2d 787, 790, 214 USPQ 678, 681 (CCPA 1982).

As stated in MPEP § 2106 (IV)(B)(2)(b)(ii), the computer-related process may be limited to a practical application in the technological arts as described below:

There is always some form of physical transformation within a computer because a computer acts on signals and transforms them during its operation and changes the state of its components during the execution of a process. Even though such a physical transformation occurs within a computer, such activity is not determinative of whether the process is statutory because such transformation alone does not distinguish a statutory computer process from a nonstatutory computer process. What is determinative is not how the computer performs the process, but what the computer does to achieve a practical application. See Arrhythmia, 958 F.2d at 1057, 22 USPQ2d at 1036.

Claims 22-35 do not fulfill either of these statutory requirements and are therefore rejected under 35 U.S.C. 101 because the claims are directed to non-statutory subject matter.

The rejection of claims 22-35 is maintained under 35 U.S.C. 101 because the claims are directed to non-statutory subject matter.

This rejection is maintained and reiterated for reasons of record.

As written, the claims appear to be directed to a method that merely manipulates numbers, abstract concepts or ideas, or signals representing any of the foregoing.

As stated in MPEP § 2106, (IV)(B)(1), if the “acts” of a claimed process manipulate only numbers, abstract concepts or ideas, or signals representing any of the foregoing, the acts are not being applied to appropriate subject matter. Schrader, 22 F.3d

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at 294-95, 30 USPQ2d at 1458-59. Thus, a process consisting solely of mathematical operations, i.e., converting one set of numbers into another set of numbers, does not manipulate appropriate subject matter and thus cannot constitute a statutory process.

In practical terms, claims define nonstatutory processes if they:

- consist solely of mathematical operations without some claimed practical application (i.e., executing a “mathematical algorithm”); or
- simply manipulate abstract ideas, e.g., a bid (Schrader, 22 F.3d at 293-94, 30 USPQ2d at 1458-59) or a bubble hierarchy (Warmerdam, 33 F.3d at 1360, 31 USPQ2d at 1759), without some claimed practical application.

Claims 22-35 do not fulfill any of these statutory requirements and are therefore rejected under 35 U.S.C. 101 because the claims are directed to non-statutory subject matter.

Applicants state the sections of the MPEP submitted by the Examiner are under the “Safe Harbors” section. MPEP section 2106 (IV)(B)(2)(b)(i) and (ii) were described to make the Applicants aware of what is considered statutory and nonstatutory, as examples of both are included in the arguments previously set forth (reiterated above). As one interpretation of the claims includes an invention without any steps outside of the computer, the claims are considered to be nonstatutory. In order to have a practical application, there must be a physical step (outside of the computer) that must take place.

Applicants quote MPEP section § 2106 (IV)(B)(2)(b)(ii) including the following:

“For example, a computer process that simply calculates a mathematical algorithm that models noise is nonstatutory. However, a claimed process for digitally filtering noise employing the mathematical algorithm is statutory.”

The instant invention appears to fit into the nonstatutory category listed above directed to modeling noise. This is because the instant method appears to be performing computer-related functions representing a type of modeling without providing any sort of physical application which could be construed as being a practical application, such as the noise filtering in the example given above. Such a physical application would provide a practical application which could lead to a concrete, tangible, and useful result that would make the invention statutory. The current claims lack such a practical application and are thus considered to be nonstatutory.

Applicants state the perturbation in step (a) of claim 22 is performed outside of a computer and cite page 30, lines 14-22, of the specification including “any physical modification or treatment of the biochemical system as well as exposure to any stimulus. Therefore, a perturbation can include, for example, genetic alterations...” The “for example” section is an exemplification which is not a clear and explicit definition defining the term perturbation. Therefore, the term can be given its broadest reasonable interpretation, which includes one interpretation of claim 22 step (a) as not being performed outside of a computer. It is this interpretation found in claim 22 step (a) that is rejected as being nonstatutory.

Applicants cite sections of the specification (i.e. page 58, lines 15-30 and page 106, line 29 to page 110, line 6) which state how the identified function of a system can be used. These putative uses are not included in the instant claims which are what are

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relied on to determine statutory or nonstatutory subject matter. Appropriately placing in the claims a useful function or physical step outside the computer would be sufficient to remove the nonstatutory rejections, because a useful, concrete, and tangible result would now be set forth in the claims.

Claim Rejections – 35 U.S.C. 112, First Paragraph

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Factors to be considered in determining whether a disclosure would require undue experimentation have been summarized in *Ex parte Forman*, 230 USPQ 546 (BPAI 1986) and reiterated by the Court of Appeals in *In re Wands*, 8 USPQ2d 1400 at 1404 (CAFC 1988). The factors to be considered in determining whether undue experimentation is required include: (1) the quantity of experimentation necessary, (2) the amount or direction presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) the predictability or unpredictability of the art, and (8) the breadth of the claims. The Board also stated that although the level of the skill in molecular biology is high, the results of experiments in genetic engineering are unpredictable. While all of these factors are considered, a sufficient amount for a *prima facie* case are discussed below.

LACK OF SCOPE OF ENABLEMENT

The rejection of claims 22-35 is maintained under 35 U.S.C. § 112, first paragraph, because the specification, while being enabling for certain aspects of assigning a cellular function to a component, does not reasonably provide enablement for such an assignment of any cellular function. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

This rejection is maintained and reiterated for reasons of record.

The method steps of these claims involve assigning a cellular function to a component via analysis of data involved with a perturbed state. One skilled in the art would be able to reasonably conclude that a difference in data for a component between a reference and perturbed state could be linked to the perturbed state. However, the last two lines of independent claims 22, 24, and 30 are broadly written to encompass an assignment of any cellular function to the component that is not necessarily linked to the perturbed network or pathway. In order to assign a cellular function to the claimed component in these methods, one skilled in the art would need to perform undue experimentation to determine if the component could reasonably be assigned to a cellular function outside of what is considered the perturbed network or pathway. Due to the unpredictability of determining functions of components such as nucleic acids and polypeptides, the amount of experimentation required to determine such functions, and the lack of guidance provided in the specification, one of skill in the art would not be able to make and use the claimed invention beyond assigning a function linked directly to the perturbed network or pathway. Therefore, these claims are rejected under a lack of scope of enablement.

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Applicants state they have satisfied the standard to enable the claimed invention by teaching those skilled in the art how to make and use the invention as claimed without undue experimentation. This statement is found unpersuasive for the reasons stated in the paragraph above. Applicants state the claims expressly link the recited component to the perturbed biochemical network as well as the cellular function of that component to the cellular function of that network. This statement is found unpersuasive as claims 22, 24, and 30 (last two lines) merely state “assigning a cellular function of said network” without any mention of whether this function is linked to the perturbed network or pathway. Applicants state they are not claiming assignment of *any* cellular function. This statement is found unpersuasive as these claims can be broadly and reasonably interpreted to encompass assignment of any cellular function.

Claim Rejections – 35 USC §102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

The rejection of claims 22-35 is maintained under 35 U.S.C. 102(b) as being anticipated by Stoughton et al. (P/N 6,132,969).

This rejection is maintained and reiterated for reasons of record.

Stoughton et al. disclose laboratory and computer methods for testing and confirming how well a network model represents a biological pathway in a biological

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system (abstract). Stoughton et al. disclose the network comprises logical operators relating to input cellular constituents (components), such as mRNA and proteins, to output classes of cellular constituents which are affected by the pathway (abstract), which represents assigning a cellular function to components (col. 10, line 61 to col. 11, line 2), as stated in instant claims 22, 24, and 30. Stoughton et al. disclose comparing relative changes (normal versus perturbed) in the biological system in response to perturbations of the network (abstract and col. 8, lines 40-41 and col. 8, line 64 to col. 9, line 12).

Stoughton et al. disclose predicting how output classes behave in response to the chosen experiments by finding measures (multidimensional coordinate points) of relative change of cellular constituents (components) and finding goodnesses of fit (“the conformity between an experimental result and theoretical expectation”, according to Merriam-Webster’s online dictionary) of each observed component to an output class (reference data element region) based on strongest correlations (abstract), which represent a linkage to the perturbed biochemical network. Stoughton et al. disclose determining the overall goodness of fit of the network model (network-associated expression region) from the individual goodnesses of fit of each observed component (abstract), which represents determining the multidimensional coordinate point of the network via the set of components, as stated in instant claim 24. Stoughton et al. disclose observing a system’s response to known inputs via gene expression and/or protein abundances (col. 2, first paragraph), as stated in instant claims 23, 26, 28, 29, 32, 34, and 35. Stoughton et al. disclose the biological system as a cell, organism, and patient (col. 5, line 67 to col. 6, line 1), as stated in instant claims 25 and 31.

Thus, Stoughton et al. anticipate the limitations in claims 22-35.

Applicants state the claimed invention is distinguishable from Stoughton et al., because Stoughton et al. do not describe determining a multidimensional coordinate point. Applicants state a multidimensional coordinate point corresponds to a coordinate that is a combination of two or more data elements. It is noted that something that “corresponds to” something else, is not necessarily the original something itself. In addition, the sections cited by Applicants when referring to multidimensional coordinate points include exemplifications that are not explicit definitions. Therefore, the phrase “multidimensional coordinate point” has been broadly and reasonably interpreted to include the measures of relative change of cellular constituents in response to perturbations, as stated by Stoughton et al. (abstract). As far as a multidimensional coordinate point corresponding to a coordinate that is the combination of two or more data elements, Stoughton et al. disclose comparing relative changes between two states in a biological system (col. 3, lines 15-20) which clearly falls into this corresponding definition. Regarding multidimensional coordinate point representative of a data element of two components is defined by two parameters corresponding to values representative of data elements of the two components (page 17-18 of instant specification), Stoughton et al. disclose use of transcript microarrays (arrays involving mRNA containing x and y dimensions) (col. 51, lines 39-49) and making measurements (values) of graded drug exposure and of graded levels of modification/perturbation control parameters (col. 52, lines 1-17). The invention of Stoughton et al. is clearly encompassed in the instant claims, such that the 35 USC 102(b) rejection is maintained.

Conclusion

No claim is allowed.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Papers related to this application may be submitted to Technical Center 1600 by facsimile transmission. Papers should be faxed to Technical Center 1600 via the PTO Fax Center located in Crystal Mall 1. The faxing of such papers must conform with the notices published in the Official Gazette, 1096 OG 30 (November 15, 1988), 1156 OG 61 (November 16, 1993), and 1157 OG 94 (December 28, 1993) (See 37 CFR §1.6(d)). The CM1 Fax Center number is (703) 872-9306.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Carolyn Smith, whose telephone number is (571) 272-0721. The examiner can normally be reached Monday through Thursday from 8 A.M. to 6:30 P.M.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Woodward, can be reached on (571) 272-0722.

Any inquiry of a general nature or relating to the status of this application should be directed to Legal Instruments Examiner Tina Plunkett whose telephone number is (571) 272-0549.

August 23, 2004

Ardin H. Marschel 8/28/04
ARDIN H. MARSCHEL
PRIMARY EXAMINER